

# Redescriptions, synonyms, and distribution of two species of Lonchodinae from Borneo: *Lonchodes catori* Kirby and *Lonchodes hosei* (Kirby).

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## Abstract

*Lonchodes catori* Kirby and *Lonchodes hosei* (Kirby) are redescribed and distribution maps are given. Synonymies are listed for these two species and for the West Malaysian species *Lonchodes brevipes* Gray. The features distinguishing the closely related *L. brevipes* and *L. catori* are listed and illustrated. Lectotypes are selected for *L. catori* and *L. mindanaense* (Brunner). *Lonchodes mindanaense* is not a synonym of *L. hosei*. *Hermogenes cristatus* Kirby is a new junior synonym of *L. hosei*. *Dixippus jejunos* Brunner is a new junior synonym of *L. catori* Kirby. *Dixippus sodalis* Kirby is not a synonym of *L. brevipes*.

## Key words

Phasmida, *Lonchodes catori*, *L. brevipes*, *L. hosei*, *L. mindanaense*, Distribution, Borneo.

## Introduction

Günther (1932) published a revision of *Lonchodes*, in which he gave many new synonyms. Unfortunately he did not examine many of the type specimens and the paper appears to contain more wrong synonyms than correct ones. The genus presents problems because of the variation which occurs in the females and because of the strong sexual dimorphism. Most species have been inadequately described and most were not illustrated when they were described. Identification based on either of the available keys is unsatisfactory: Brunner's keys (1907) and descriptions are too brief, and Günther (1932) synonymised too many distinct species. I have checked several of the PSG cultures and type specimens of several species and can correct several synonyms. Below I give redescriptions of *L. catori* Kirby and *L. hosei* (Kirby), and details of all the relevant material which I have examined. I also include some details and a list of synonyms for *L. brevipes* (Gray), a species which is easily confused with *L. catori*. My own specimens have individual numbers prefixed by my initials and a hyphen; specimens in other museums are indicated by the use of standard codens as follows:

BMNH	British Museum of Natural History, London, U.K.
MCSN	Museo Civico de Storia Naturale "Giacomo Doria", Genova, Italy.
MHNG	Museum d'Histoire Naturelle, Geneva, Switzerland.
NHMB	Naturhistorisches Museum, Basel, Switzerland.
NHMW	Naturhistorisches Museum, Wien (Vienna), Austria.
OXUM	Oxford University Museum, Oxford, U.K.
RMNH	Nationaal Natuurhistorische Museum, Leiden, Netherlands.
SMSM	Sarawak Museum, Kuching, Sarawak.
SMTD	Staatliches Museum für Tier-kunde, Dresden, Germany.

## *Lonchodes catori* Kirby, 1896

*Lonchodes catori* Kirby, 1896: 454; Brunner, 1907: 262. Lectotype [here selected] ♂ (BMNH, 95-140) Sabah, Sandakan, 28.ii.1893; Paralectotype ♀ nymph (BMNH, specimen not located) Sabah, Sandakan.

*Staelonchodes catori* (Kirby); Kirby, 1904: 318.

*Dixippus jejunos* Brunner, 1907: 278. Syntypes ♂♂, ♀♀ (NHMW, 523) Borneo; (NHMB) Sumatra, Indragiri. New synonym.

*Lonchodes jejunos* (Brunner); Hausleithner, 1989: 102, figs 2e-f (egg); Bragg, 1991a: 76-80; Bragg, 1991b: 18-21; Bragg, 1992: 300.

*Lonchodes uniformis*, Shelford, 1916: 153 [not Westwood, 1848], synonymised by Bragg 1992: 300.

[*Lonchodes uniformis* Westwood. Synonymised in error by Günther, 1935: 125]

## Material examined

### BORNEO

♀ (BMNH, 89-84) [acquired 1889]

### BRUNEI

Bandar Seri Begawan, Kota Batu

♀ (PEB-2216), ♂ (PEB-2217) 02.xi.1994

BRUNEI

Badas

- 2♀♀ (PEB-2213; PEB-2214), ♂ (PEB-2215) 31.x.1994  
 unspecified area (probably Badas)  
 ♀ (PEB-1422), ♂ (PEB-1421) Bred by Mel Herbert, 1992  
 3♀♀ (PEB-1460; PEB-1461; PEB-1821), 2♂♂ (PEB-1459;  
 PEB-1495) reared, 1992  
 eggs (PEB-1423) Laid by PEB-1422. 1992

SABAH

Kota Kinabalu

- eggs (PEB-667; PEB-1080) Female not preserved. 01.viii.1990  
 ♀ (PEB-666) reared from PEB-1080 & PEB-667. 1990

Sandakan

- ♂ Lectotype of *L. catori* (BMNH, 95-140) 28.ii.1893

Ulu Dusun

- ♂ (BMNH, BM 1977-615) A. Lamb, 14.iv.1976

SARAWAK

locality not specified

- ♂, ♀ nymph (BMNH, 1900-117) Shelford [acquired 1900]

15km NE of Selangau

- ♀ (PEB-2226), ♂ (PEB-2227) 26.x.1994

22km SW of Selangau

- ♂ (PEB-2225) 26.x.1994

3km NE of Tatau

- ♂ (PEB-2219) 04.xi.1994

Bahagian Kuching

- 2♀♀ (PEB-1224; PEB-1230), ♂ (PEB-1235) reared 1989  
 nymph (PEB-1350) viii.1989

Damai, 30m

- ♀ (PEB-657) Contained mermithid larvae. 28.xii.1987  
 ♀ (PEB-1226) Contained mermithid larvae. 28.xii.1987  
 eggs (PEB-1234) laid by PEB-657 & PEB-1226, 28.xii.1987  
 ♀ nymph (PEB-1232) 28.xii.1987  
 3♀♀ (PEB-1335; PEB-1336; PEB-1338), 2♂♂ (PEB-669;  
 PEB-1237) 1st generation reared, 1988

SARAWAK

Bengoh

- ♀ (PEB-659) 29.vii.1989  
 2♀♀ (PEB-1337; PEB-1341), ♂ (PEB-670) 31.vii.1989  
 2♀♀ (PEB-658; PEB-1225), ♂ (PEB-668) ♀ nymph (PEB-1340)  
 01.viii.1989

Kuching, Jalan Stampin Timur

- ♂ (PEB-1348) 17.viii.1989

Mt Santubong, 30m

- ♂ (PEB-1238) 17.viii.1989

Mt Santubong, 700m

- ♀ (PEB-1653), ♂ (PEB-1652) 11.viii.1992

Mt Santubong, 880m

- ♀ (PEB-1654) Mounted with eggs. 11.viii.1992

Mt Santubong, 50-300m

- ♀ (PEB-2221) Mounted with eggs. 21.x.1994

Niah NP

- ♀ (PEB-1631) Mounted with eggs, ♂ (PEB-1630) 16.viii.1992

Batu Niah

- 2♀♀ (BMNH, BM 1982-387) A. Harman, xi-xii.1980  
 2♀♀, ♂ (BMNH, BM 1982-387) A. Harman, xii.1980

Simunjan

- ♀ (PEB-629), 2♂♂ (PEB-628; PEB-630) 17.viii.1991  
 eggs (PEB-633) Eggs from several females at this locality.  
 17.viii.1991

Tarum

- ♀ (PEB-2218) Mounted with eggs. 25.x.1994

near Betong

- ♀ (PEB-2222), ♂ (PEB-2223) mating pair, 25.x.1994  
 ♀ (PEB-2227), ♂ (PEB-2224) 25.x.1994

mixed stock (Western Sarawak)

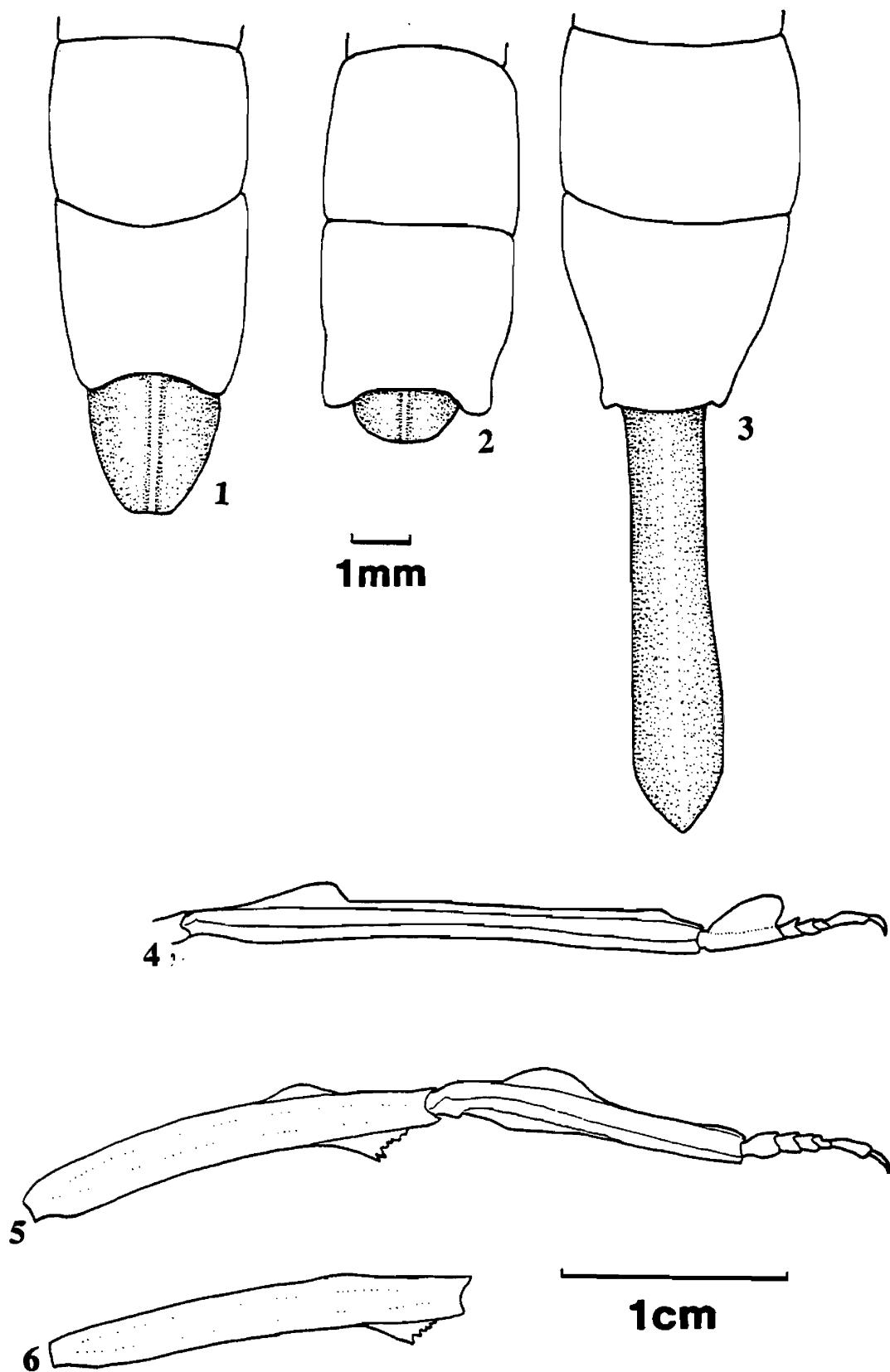
- 7♀♀ (PEB-671; PEB-672; PEB-1227; PEB-1228; PEB-1229;  
 PEB-1231; PEB-1339) 1990  
 5♂♂ (PEB-632, PEB-674; PEB-1011; PEB-1095; PEB-1236)  
 1990  
 spermatophores (PEB-1233) from floor of cage, 1990

**Female (Figures 2, 4-6, 8-9)**

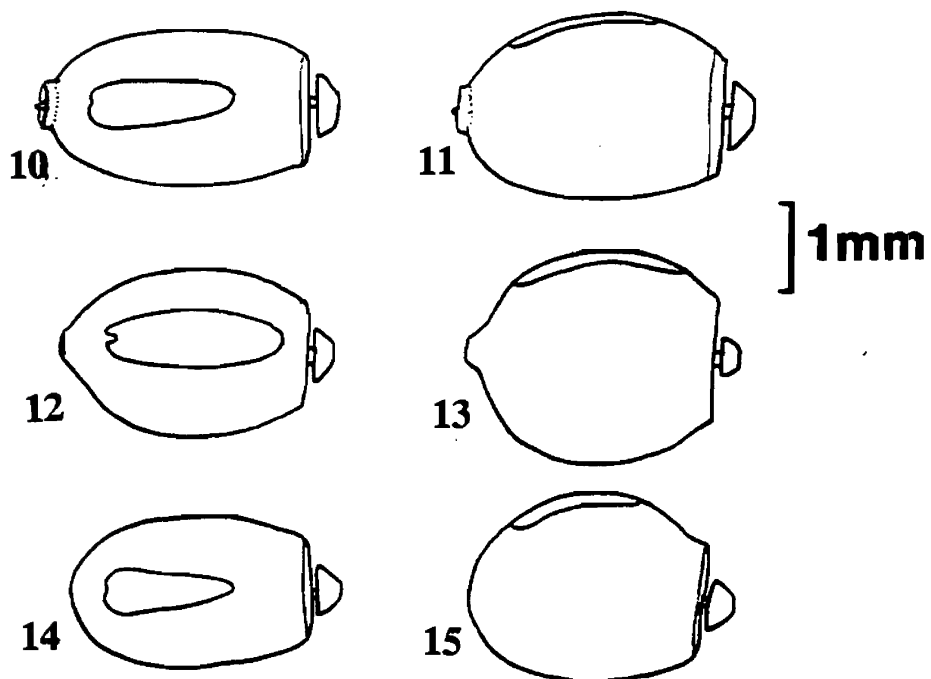
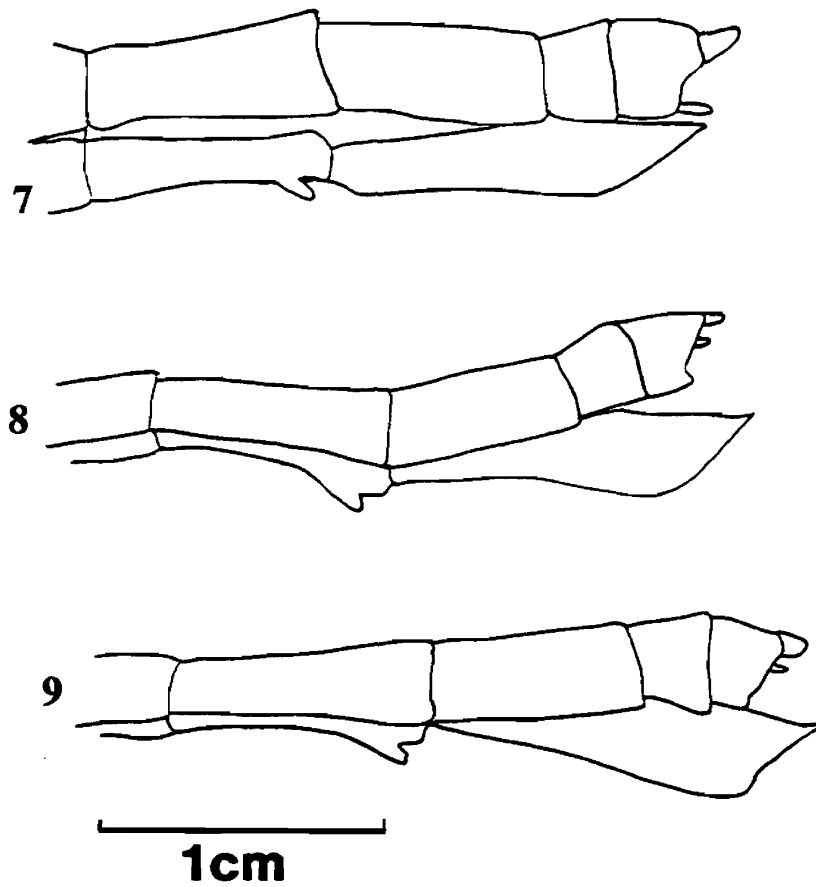
Head, body and legs uniformly mid brown, dark brown, or dark green-brown. In green-brown specimens the hind legs tend to be much greener than the rest. Head and thorax evenly granulose; abdominal terga evenly granulose at anterior, becoming sparingly and indistinctly granulose towards the posterior, abdominal sternites smooth, operculum setose. Femora and tibiae setose, particularly on the carinae; mid femora granulose. Body length 117-158mm.

Antennae longer than the fore legs, with basal segment flattened and laterally dilated, second segment twice as thick as remainder. Head slightly longer than wide, with a very slight ridge between the eyes, sometimes with a minute pair of spines. Pronotum about one-and-a-third times longer than wide with a median transverse depression, a shallow longitudinal groove and a shallow groove just behind the anterior margin. Mesonotum long, widening only slightly until just before the leg joint where it widens and flattens; at this point the mesopleura project, increasing the body width to one-and-a-half times the width of the mesonotum. Metanotum of uniform width. Median segment slightly longer than wide; about one quarter of the length, and slightly narrower than the metanotum. Metapleura projecting slightly. Abdomen of similar width to the thorax, segments 2-8 roughly twice as long as wide, 8th slightly constricted in the middle, 9-10 about as long as wide. Anal segment with posterior margin slightly indented. Lamina supraanalis roughly semicircular, about twice as wide as long (figure 2). Operculum reaching to end of anal segment, scoop-shaped, with a slight ventral keel, apex rounded. Posterior of 7th sternite with a small conical, spine-like, praeopercular organ (figures 8 & 9). Cerci very short, slightly flattened.

Hind legs reaching just beyond the end of the 6th abdominal segment, mid legs almost to the end of the 3rd segment; middle femur not reaching the posterior of the median



Figures 1-6. 1-3. Apex of female's abdomen: 1, *L. brevipes*; 2, *L. catori*; 3, *L. everetti*;  
4-6. *L. catori*: 4, Fore tibia and tarsus; 5-6, Middle femora.



Figures 7-15. Lateral views of apices of females' abdomens, and dorsal and lateral views of eggs: 7 & 10-11, *L. brevipes*; 8-9 & 12-15, *L. cator* (from two different localities).

segment. Fore femora compressed and incurving at the base; mid femora thickened, slightly arched, with a minute smooth lobe on the dorso-posterior carina which is variable in size (figures 5 & 6); hind femora straight and slender. All ventral carinae of femora, except ventro-anterior of fore femora, with an apical lobe which bears a few small spines, the lobes are largest on the mid femora. All tibiae with a distinct medio-ventral carina. Fore tibiae with ventro-medial carina forming a long straight lobe along the length of the tibia, the dorsal carinae unite to form a similar lobe which also bulges near the base of the tibia. Middle tibiae (figure 5) with dorsal carinae united on the basal half, forming a large rounded lobe; ventro-medial carinae with lobe on the basal half. Hind tibiae with all carinae distinct and not lobed. Fore tarsi with large rounded lobe on the basal tarsomere (figure 4). Fore and hind tarsi with 1st tarsomere about as long as 2-4 combined; mid tarsi with 1st tarsomere of similar size to 2-3.

#### Male (Figure 17)

Colour very variable: base colour usually greenish-brown or reddish-brown, frequently more or less uniformly coloured; a common variation is brown body with dark green stripe on mesothorax and metathorax and green legs, more rarely the body is green with joints of the thorax and legs red. Head, thorax (dorsally and ventrally), and middle femora granulose, abdomen smooth. Legs with all carinae setose. Body length 88-107mm.

Antennae longer than the fore legs, first two segments thicker than the rest. Head longer than wide, with a slight ridge and two very small spines between the eyes. Pronotum as in female. Anterior margin of mesonotum slightly wider than the middle, posterior widened and flattened. Mesopleura protrude at the leg joint, at this point the body is two-and-a-half times wider than the middle of the mesonotum. Metanotum arched, slightly dilated at each end. Metapleura projecting at leg joints. Metanotum four times longer than median segment. Abdominal segments 2-7 about three times longer than wide, 8-10 much shorter than 2-7; 7th widening slightly at posterior. Segment 8 widening, and 9 narrowing, together forming a diamond shape which is twice as wide as the rest of the abdomen. Anal segment divided longitudinally, viewed from the side the dorsal surface is without any concave section (figure 17). Poculum with the ventral angle less than 90°, apex rounded. Cerci short, cylindrical.

Fore femora with base compressed and incurving, apex of ventro-posterior carina with one triangular lobe-like spine, ventro-anterior unarmed. Middle femur thickened and slightly arched, apex of both ventral carinae with a small lobe bearing 3-4 spines. Hind femur straight, slender, apices of ventral carinae each with 2-3 small spines. All tibiae without lobes or spines. Fore tarsi with lobe on basal tarsomere. Fore and hind tarsi with first tarsomere as long as combined length of 2-4, mid tarsi with first tarsomere only as long as 2-3.

#### Egg (Figures 12-15)

Capsule and operculum mid to dark brown, micropylar plate light brown or cream, occasionally the micropylar plate is surrounded by a blackened area, capitulum orange. Capsule ovoid, covered with minute pits; with or without a polar mound, if present it is very small and solid (without a central hollow). Micropylar plate almost oval, wider at polar end. Operculum flat. Typical length 2.8mm, height 2.3mm, width 1.9mm.

#### Comments

This species is extremely closely related to *Lonchodes brevipes* Gray, distinguishing the species is difficult. The males may be distinguished by the shape of the poculum which is

more angular in *brevipes*, and by the anal segment which does not have a concave dorsal edge and is not as slender as that of *brevipes*. The eggs of *brevipes* are clearly longer than high and have a large polar mound, those of *catori* are almost spherical and if a polar mound is present it is generally small (those from Kota Kinabalu, figures 12-13, are relatively large). Females of *brevipes* have an operculum which is more or less straight and lacks a distinct keel, the operculum of *catori* is deeper at the apex and often has a distinct keel; the lamina supraanalis of *catori* is never longer than wide, that of *brevipes* is longer than wide (in the few specimens examined); *brevipes* females are often more robust and the thorax is more dilated where the legs join.

The two BMNH specimens from the Sandakan district of Sabah (BM 95-140 & BM 1977-615) both have the same unusual colouring: green body with the head and legs orange and the thorax orange around the leg joints; Kirby's specimen has femora which are mainly green.

Although I have not examined Brunner's specimens of *jejunus* in detail, it is almost certain that the Bornean specimens are the same species; this may not be true for the Sumatran specimens.

### Distribution (Figure 26)

There are a considerable number of specimens in the Sarawak Museum which appear to be this species. These specimens are from Kuching, Matang, Matang Road, and two from Baram; I have not checked the identity of these specimens so they are not included on the distribution map. The distribution map shows only material which I have checked, most of this is material which I have personally collected. The species is clearly widespread in northern Borneo (figure 26) where most of my collecting has been done; it may be widespread in Kalimantan but I have only collected at three sites and did not find any *L. catori*.

### Cultures

Mainly as a result of collecting at a series of different sites along the length of Sarawak in 1994, three cultures (39, 119 and 129) on the Phasmid Study Group culture list were found to be the same species, two of these were previously misidentified as *L. uniformis* (PSG 39), and *L. validior* (PSG 129), the third culture was previously listed by the junior synonym *L. jejunus* (PSG 119). Culture 129 is from Brunei and is still in culture, as is culture 119 from western Sarawak; culture 39 from eastern Sarawak died out many years ago. Culture 39 was collected by Allan Harman from Niah in 1980 and died out in the mid 1980s. Culture 129 is based on material collected by Mel Herbert at Badas. Culture 119 is based on material collected by myself and various companions over several years, mainly from Bengoh, Mt Serapi, and Mt Santubong. This species feeds on bramble, eucalyptus, raspberry and rose.

## *Lonchodes brevipēs* Gray, 1835

*Lonchodes brevipēs* Gray, 1835: 19; Westwood, 1859: 36; Kirby, 1904: 321; Hausleithner, 1989, fig 2a (egg): 102; Hausleithner, 1991: 233; Seow-Choen et al., 1994a: 12, fig 6; Seow-Choen et al., 1994b: 394; Brock, 1996: 85. Holotype ♂ (BMNH, 40-30-3-712) India, Malabar.

*Lonchodes pterodactylus* Gray, 1835: 19; Synonymised by Westwood, 1859: 36; Günther, 1932b: 382. Syntypes ♀ (BMNH, 40-30-3-709), ♂ (BMNH, 40-3-30-712), Malabar.

*Prisomera pterodactylus* (Gray), Brunner, 1907: 288.

*Phasma* (*Bacteria*) *nodosum* (*sumatranum*) de Haan, 133, pl. 13.6 (♀). Synonymised (with *pterodactylus*) by Günther, 1932b: 382. Holotype ♀ (RMNH) Sumatra, Batang Singalang.

*Prisomera gestroi* Brunner, 1907: 289; Brock, 1996: 86 [Lectotype designation]. Lectotype ♀, Paralectotype ♂ (MCSN) Sumatra, Mentawai Island. Synonymised by Günther, 1932b: 382.

- Phasma (Lonchodes) uniforme* Westwood, 1848: 79, pl. 39.3. Holotype ♂ (OXUM, 571) Prince of Wales' Island, coll. D. Cantor. Synonymised by Brock, 1996: 86.
- Lonchodes uniformis* Westwood, Westwood, 1859: 37; Kirby, 1904: 321; Günther, 1932b: 382; Klante, 1960: 99, figs 8 (♂), 9 (♀); Hausleithner, 1989: 102, fig 2b (egg).
- Dixippus uniformis* (Westwood), Rehn, 1904: 42.
- Prisomera uniforme* (Westwood), Brunner, 1907: 288.
- Phasma (Bacteria) nodosum (sumatranum)* de Haan, 1842: 133, pl. 13.3. Synonymised (with *uniformis*) by Brunner, 1907: 288. Holotype ♀ (RMNH) Sumatra, Batang Singalang.
- Dixippus validior* Brunner, 1907: 279. Synonymised with *uniformis* by Günther, 1935: 125. Lectotype ♂, Paralectotypes 8♂♂, 12♀♀ (NHMW, 533) West Malaysia, Perak.
- Carausius validior* (Brunner); Brock, 1996: 86 [Lectotype designation].
- [*Dixippus jejunus* Brunner; Synonymised in error by Günther, 1935: 125; corrected by Bragg, 1992: 300.]
- [*Dixippus sodalis* Kirby, 1896: 459. Synonymised in error by Günther, 1932b: 382.]
- [*Lonchodes dispar* Bates, Synonymised in error by Günther, 1932b: 382, corrected by Bragg, 1992: 299.]

## Material examined

### WEST MALAYSIA

locality unknown (Original PSG culture)

- ♂ (PEB-1345), ♀ nymph (PEB-1342), ♂ nymph (PEB-1343) 1988  
 3♀♀ (PEB-655; PEB-656; PEB-1344), ♂♂ (PEB-663; PEB-664;  
 PEB-1346), eggs (PEB-665) 1989

Pahang, Tasik Chini

♀ (PEB-2237), ♂ (PEB-2236) 15.x.1994

Perak, 4 miles SW Tanjong Malim

♂ (BMNH, BM 1964-39) J.R. Piffet, 19.v.1959

## Comments

The female (figures 1 & 7) is very similar to *L. catori* but the lamina supraanalis is at least as long as wide (figure 1) but never as long as *L. everetti* Kirby (figure 3), and the operculum lacks a keel. The male is very similar to *L. catori* but anal segment when viewed laterally has a concave dorsal edge (Figure 16). Egg similar to *L. catori* but not as high or as wide, polar mound larger and with a central hollow (figures 10-11).

*Lonchodes brevipes* has been recorded from the river Mahakam in Borneo by Günther (1943: 153), but Günther regarded *jejunus* (= *catori*) and *brevipes* as synonymous so the specimens are probably *L. catori*. Hausleithner's (1991) record of a female from Ulu Dusun is probably a specimen of *L. catori* although I have not examined the material.

Examination of the type specimen of *Dixippus sodalis* Kirby shows that it is clearly a different species to *catori*, so Günther was wrong to synonymise these species.

## *Lonchodes hosei* (Kirby, 1896)

*Hermogenes hosei* Kirby, 1896: 457. pl. 40.1. Holotype ♀ (BMNH, 89-24) Sarawak, Baram district, coll. C. Hose.

*Hermagoras hosei* (Kirby); Kirby, 1904: 322.

*Prisomera hosei* (Kirby); Brunner, 1907: 286.

*Lonchodes hosei* (Kirby); Günther, 1932b: 376 [in part]; Hausleithner, 1984: fig 3a (♀), 4a (egg); Singy, 1988: 13, figs (♂, ♀♀, egg); Hausleithner, 1989: 102, fig 3e (egg); Hausleithner, 1991: 234, figs 6d, 11 (♂).

*Prisomera tuberculatum* Brunner, 1907: 287. Synonymised by Günther, 1932b: 376. Type(s): ♀ (MNHN) Mindanao.

*Prisomera palawanica* Carl, 1913: 30. Synonymised by Günther, 1932b: 376. Holotype ♀ (MHNG) Palawan.

*Prisomera morbosum* Brunner, 1907: 290. Syntype(s) ♂♂ (NHMW, 568) Sabah, Kinabalu; Listed as a possible synonym by Günther, 1932b: 376.

*Lonchodes hosei papuanas* n.ssp. Günther, 1930: 739. fig. 6 (♀). Holotype ♀ (Berlin) New Guinea, coll. Fruhstorfer.

*Hermogenes cristatus* Kirby, 1896: 457. Holotype ♀ (BMNH, 94-138) Sarawak, Baram district, C. Hose. New synonym

*Hermagoras cristatus* Kirby; Kirby, 1904: 322.

*Prisomera cristatum* (Kirby); Brunner: 289.

*Lonchodes cristatus* (Kirby); Günther, 1932b: 386.

[*Prisomera rusticum* Brunner; Synonymised in error by Günther, 1932b: 376 - Hausleithner, 1989: 102, shows the eggs are different]

[*Prisomera thoracicum* Brunner, 1907: 289. Synonymised by Günther, 1932b: 376 - in error according to Brock,

1996: 86.]

[*Prisomera mindanaense* Brunner, 1907: 286. Synonymised in error by Günther, 1932b: 376. Syntypes: ♂♂, ♀♀ (SMTD) Mindando].

[Not *Lonchodes hosei* Günther; 1932a: 69 - misidentified, see Günther 1943: 153.]

[Not *Lonchodes hosei* Günther, 1932b: 379 [in part], figs 9.3, 12.10, 12.14, 13.6 - misidentified, see Günther, 1943: 153.]

## Material examined

### NORTH BORNEO

locality not specified

♀ (RMNH) N. Borneo Expedition 1912, Mohari

### SABAH

Locality unknown (Original PSG stock)

♂ (PEB-661), eggs (PEB-662) Reared by P. Jennings, 1989

eggs (PEB-1123) Bred by R. Osbourne, pre-1985

♂ (PEB-1347) Reared by K. D'Hulster 1989

♀ (PEB-1731) Reared by M. Herbert, 1992

♂ (PEB-1432) Captive reared, 1992

Bettotan, nr Sandakan

18♂♂, 6♀♀ nymphs, 24♀♀ (RMNH) [various dates in] vii-viii.1927, C.B.K. & H.M.P. collection

♀, ♀ nymph (BMNH, BM1955-354) ex F.M.S. Museum, 25.vii.1927, C.B.K. & H.M.P. collection

♀ nymph (BMNH, BM1955-354) ex F.M.S. Museum, 27.vii.1927, C.B.K. & H.M.P. collection

♀ nymph (BMNH, BM1955-354) ex F.M.S. Museum, 10.viii.1927, C.B.K. & H.M.P. collection

♂ (BMNH, BM1955-354) ex F.M.S. Museum, 20.viii.1927, C.B.K. & H.M.P. collection

### SABAH

Sepilok Forest Reserve

♀ (PEB-1524; PEB-1525) 22.viii.1992

♂ (PEB-1522) 23.viii.1992

3♂♂ (PEB-1520; PEB-1521; PEB-1523), ♀ nymph (PEB-1526) 24.viii.1992

Mt Kinabalu NP, Poring Hot Springs, 450m

♀ (PEB-1685), ♂ (PEB-1686), eggs (PEB-1954) 21.viii.1992

Sepilok & Poring (mixed stock)

3♀♀ (PEB-2021; PEB-2022; PEB-2023), ♂ (PEB-2079), eggs (PEB-2115) 1st generation captive-reared, 1993

Tawau

♀ (PEB-2477), ♂ (PEB-2478) S. Mallet, 27.vi.1995

### SARAWAK

Bau, near Wind Cave

♀ (PEB-2246) Mounted with egg, 06.xi.1994

Niah NP, near Great Cave

♀ (PEB-2253) 28-10-1994

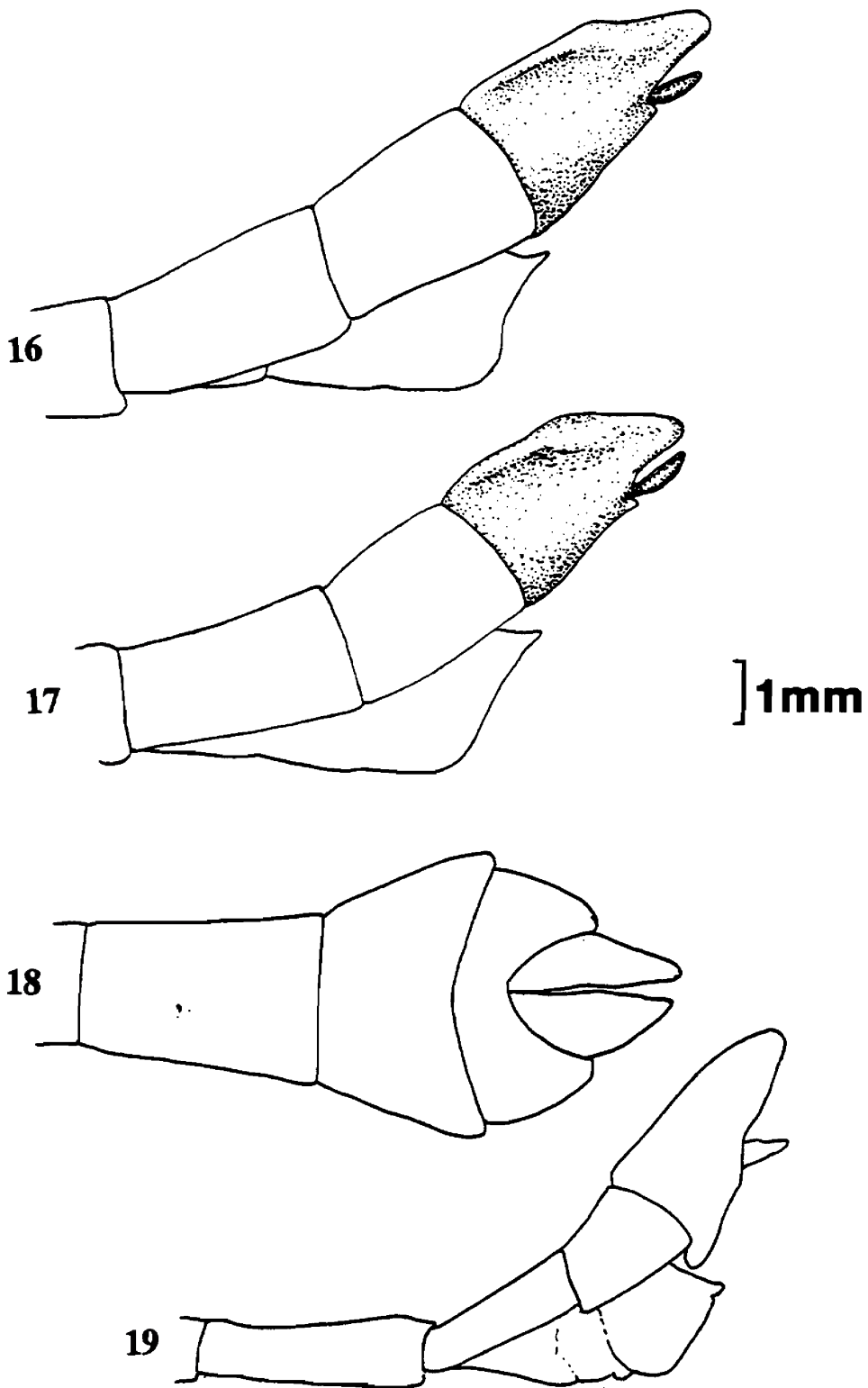
## Female (Figures 22-23)

Body coloration variable, base colour light brown to almost black; generally either dark with indistinct lighter blotches, or light brown with dark longitudinal stripes. Posterior surface of hind femur bright red or red-brown, rest of legs similar to base colour of body. Head, body and legs roughly granulose, and rugulose, some abdominal segments occasionally verrucose or lobed. Body length 110-139mm.

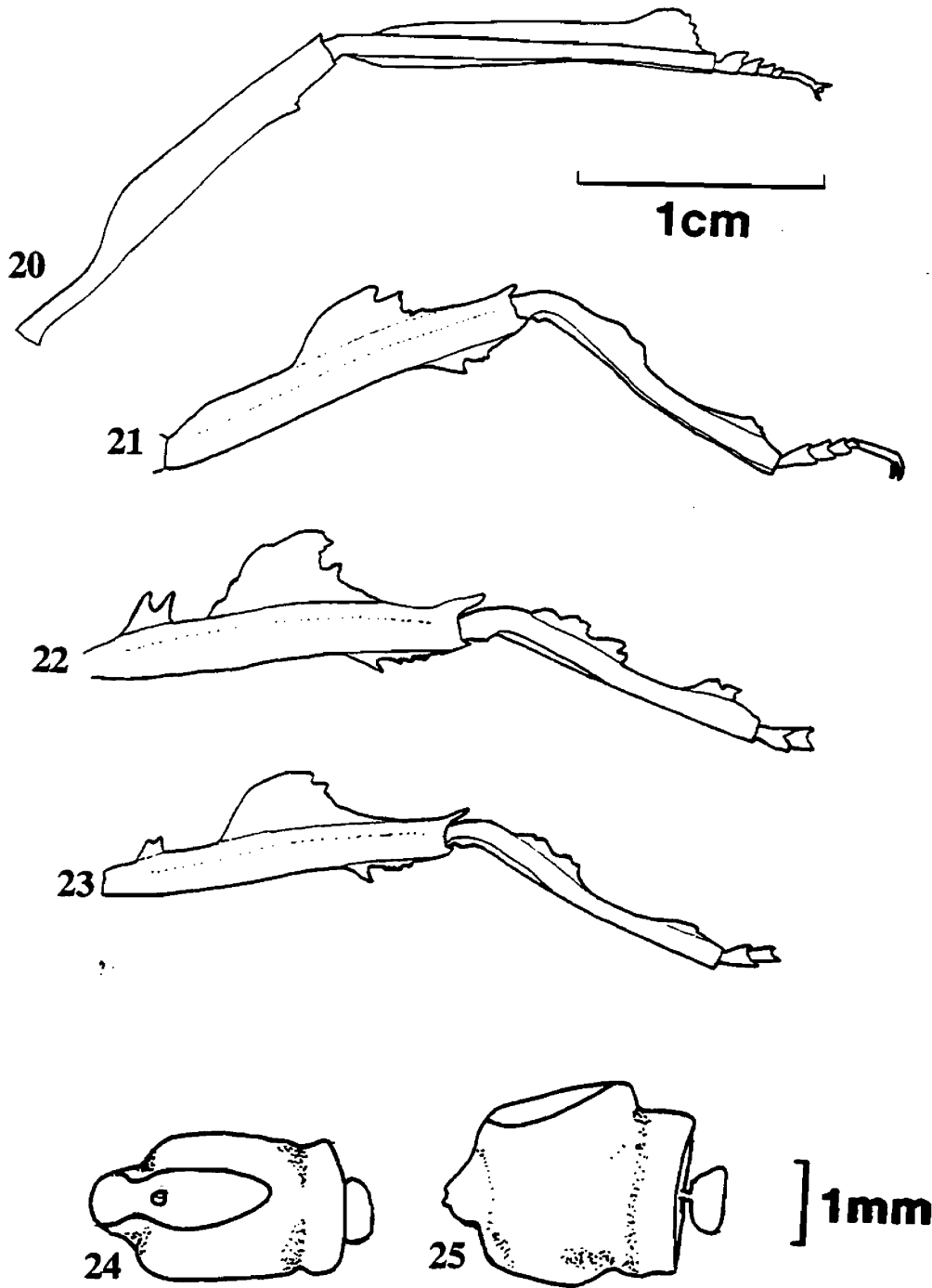
Antennae almost as long as the fore legs, basal segment flattened and dilated, second segment wider than remainder. Head rectangular, twice as long as wide. Pronotum one-and-a-third times longer than wide, with a median transverse groove. Mesonotum broader than pronotum, of almost uniform width, posterior only very slightly widened. Mesopleura projecting slightly. Metanotum of uniform width, three times longer than median segment. Median segment narrower than metanotum. Abdomen of almost uniform width, similar to thorax. Segments 2-7 of similar length, about two-and-a-half times longer than wide, 8 as long as wide, 9-10 shorter than wide. Segments 8-10 usually with a longitudinal carina. Posterior of 5th and anterior of 6th occasionally swollen and verrucose. Posterior of segments 1-8 occasionally with a pair of lobes, these specimens may also have a small lobe or swelling on the posterior of the mesonotum and metanotum. Lamina supraanalis variable, from small semicircle to pointed lobe three times longer than wide, apex may be bilobed. Operculum projecting beyond the anal segment, with a deep keel, deepest at the extremity and with a tuberculate and serrated apex. Cerci very short, usually hidden.

All femora and all tibiae with very distinct medio-ventral carinae. Apices of all femora with a blunt spine-like lobe over the joint with the tibia. Dorso-anterior carina of fore femur with irregular lobe, medio-ventral and ventro-posterior lobe-like, apex of ventro-posterior with a triangular spine-like lobe and 1-2 minute spines. Mid femur with dorsal carinae indistinct and more or less united, with two distinct lobes (figures 22-23), one small serrated lobe one third of the way along the femur, and one large serrated lobe two thirds of the way

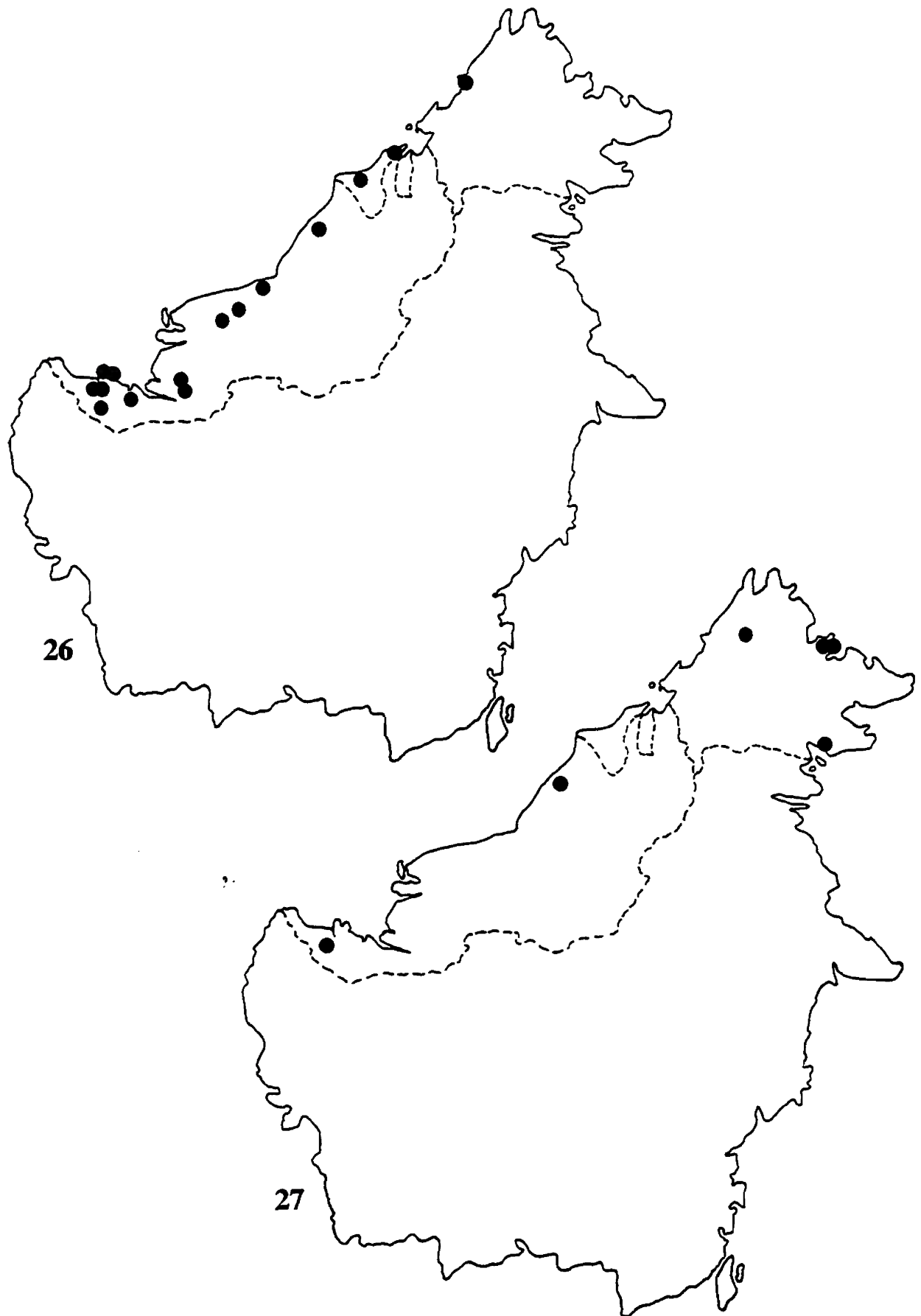




**Figures 16-19.** Apices of males' abdomens: 16, Lateral view of *L. brevipes*; 17, Lateral view of *L. catori*; 18-19, Dorsal and lateral views of *L. hosei*.



Figures 20-25. 20-21. Lectotype of *L. mindanaense*: 20, Fore leg; 21, Middle leg. 22-25. *L. hosei*: 22-23, Middle leg; 24-25, Dorsal and lateral views of egg.



Figures 26-27. Distribution maps for: 26, *L. catori*; 27, *L. hosei*.

along; apical quarter ventro-anterior and ventro-posterior carinae each with an undulating lobe with a distinct triangular spine-like lobe and 2-3 minute spines, medio-ventral unarmed. Hind femur with ventro-anterior carina rather indistinct, apices of ventro-anterior and ventro-posterior each with one small and 1-2 minute spines. Dorsal carinae of fore tibia united to form a lobe running the length of the tibia, apex of lobe may be smooth or serrated; medio-ventral carina lobe-like, reducing in size apically. Dorsal carinae of middle tibia united; with two serrated lobes, one apically, one basally. All tarsi short, with segments 1-4 of similar size.

#### **Male (Figures 18-19)**

Head, body and legs mid brown or greenish-brown, hind femur red-brown particularly on the posterior surface. Occasionally the thorax has a few narrow dark green bands. Head and thorax densely granulose, femora and abdomen granulose, posterior of abdomen very sparsely granulose.

Antennae longer than the fore legs, basal segment slightly flattened, first two segments thicker than remainder. Head rectangular, one-and-a-half times longer than wide. Pronotum one-and-a-quarter times longer than wide, with a median transverse furrow. Mesonotum of almost uniform width but doubling in width near the posterior. Mesopleura projecting, increasing the width of the mesothorax to two-and-a-half times the middle of the mesonotum. Metanotum arched, narrowing slightly at the anterior; three times longer than the median segment. Abdominal segments 2-6 about four times longer than wide, 7th much shorter and widening, 8th and 9th dilated, wider than long (figure 18). Anal segment deeply cleft, forming two triangular lobes. Poculum deep, angular, with a slight keel, apex with a distinct flattened rim.

Ventro-posterior carina of fore femora with 2-3 small spines at the apex, ventro anterior unarmed; apices of ventro-posterior and ventro-anterior of mid femora with one small and 1-3 very small spines; ventro-posterior and ventro-anterior of hind femora each with two small spines. Dorsal carinae of middle femur indistinct except for a short section of dorso-posterior carina near the apex. Dorsal surface of fore tibia with a narrow lobe running the full length. Apex of middle tibia slightly thickened. All tarsi with basal tarsomere about as long as segments 2-3 combined.

#### **Egg (Figures 24-25)**

Capsule and operculum dark grey-brown, micropylar plate light grey or cream, capitulum orange. Capsule with polar mound, micropylar mound, ventral and dorsal surfaces concave near anterior end, ventral edge narrow, almost forming a keel. Polar mound with a central hollow, and lower on the dorsal side. Length 3.5mm (polar mound 0.4mm), height 3.0mm, width 2.2mm; operculum height 1.7mm, width 1.3mm.

#### **Comments**

*Hermogenes cristatus* is clearly a synonym of *hosei*, the mid femora of the holotypes have the same shape of lobes and spines, the differences described by Kirby are all variable characteristics. The differences found in *cristatus* are the presence of a lobe on the posterior of the pronotum and posterior of the mesonotum, a spine-like lobe on the posterior margin of the 2nd abdominal segment and wide lobe on the posterior margin of the 7th segment, and the lobes on the fore tibia are smooth until the apex where they widen quite suddenly; all these features can occur in cultured specimens of *hosei*. The holotype of *hosei* has a wide lobe on posterior of 5th abdominal segment, and two small lobes on anterior of 6th segment, and the lobes on the fore tibiae are broad and wavy. Some of the variations which occur in

this species have been illustrated by Singy (1988).

*Lonchodes rusticus* (Brunner) is clearly closely related to *L. hosei*, it may be distinguished by the basal lobe on the dorsal surface of the mid femur which is rounded in *rusticus* and serrated in *hosei*; the egg of *rusticus* does not have a partly concave ventral surface unlike *hosei*, and the capsule is smoothly ovoid whereas *hosei* has a keel-like compression of the dorsal and ventral edges. *L. rusticus* may be little more than small variety of *L. hosei*, or perhaps a subspecies but, until more is known about it, it seems wise to treat it as a distinct species.

I have not examined the type material of all the species which Günther placed as junior synonyms, however I have examined *L. mindanaense* (Brunner) which is clearly a different species (see below). It is unlikely that *Prisomera tuberculatum* Brunner and *Prisomera palawanica* Carl are correctly synonymised because both species were described from the Philippines, it is more likely that they are synonyms of *L. mindanaense*. As *Prisomera morbosum* Brunner was described from Sabah, it is quite likely that it is a synonym of *hosei*, or perhaps *L. rusticus* (Brunner).

It is clear from the illustration of *L. hosei papuanas* (Günther, 1930: fig 6) that this is the same species. Günther distinguished the subspecies on the basis of size, coloration and the presence of spines on the front of the lamina on the fore tibiae; all of these features occur in reared material from Sabah so *papuanas* cannot be regarded as a valid subspecies. It is likely that the locality of Günther's specimen is incorrect.

### Distribution and culture

Although this species occurs over a wide area of northern Borneo (figure 27), it is rare in Sarawak. Most of my collecting has been done in Sarawak and I have encountered only two specimens; I have spent only a few nights collecting in Sabah but have found this at two of the three sites which I have visited.

*Lonchodes hosei* was originally cultured from material collected in Sabah by Allan Harman in 1979 (Singy, 1988: 13) and was subsequently designated culture PSG 29. The original culture has been supplemented by material which I have collected in Sabah. Bramble and oak are the only foodplants which I have recorded for this species although it will probably feed on others.

### *Lonchodes mindanaense* (Brunner, 1907)

*Prisomera mindanaense* Brunner, 1907: 286. Lectotype [here selected] ♀ (SMTD) Mindando, Dapitan; Paralectotype ♂ (not located) Mindando.

[*Lonchodes hosei* (Kirby); synonymised in error by Günther, 1932b: 376.]

### Material examined

#### PHILIPPINES

Mindando, Dapitan.

♀ Lectotype (SMTD)

#### PHILIPPINES

Area not known (PSG 169)

♀ (PEB-2475), 2♂♂ (PEB-2474; PEB-2562), eggs (PEB-2518) captive reared, 1995.

### Comments

This species is currently in culture as PSG 169; I do not know from which part of the Philippines the culture originated. Although similar to *L. hosei* the female is clearly different as it lacks a distinct lobe at the base of the mid femur (figure 21). The apex of the male's abdomen is less dilated than in *L. hosei*. The egg of *mindanaense* is twice the size of *hosei* and has a smooth ventral surface. Apart from the lobe on the fore tibia which is of uniform width, my specimen agrees with the lectotype (figure 20) in all respects. The male

paralectotype is not with the female in the SMTD collection.

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